

CLAIMS

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A process for modifying a continuous web of anodized aluminum comprising:
5 providing a continuous web of aluminum including a first side and a second side;

and

selectively etching the first side to create a roughened surface on the first side but not the second side.

2. The process of claim 1 wherein the first side is etched with an etching composition chosen from at least one from sodium hydroxide, calcium hydroxide, phosphoric acid, hydrofluoric acid, sulfuric acid, bromic acid and chromic acid.

3. The process of claim 2 comprising preventing the etching composition from contacting the second side by applying fluids against the second side.

4. The process of claim 2 comprising preventing the etching composition from contacting the second side by masking the second side with a film or sheet.

5. The process of claim 2 comprising preventing the etching composition from contacting the second side by maintaining a shield member adjacent the second side.

6. The process of claim 2 wherein the etching composition is applied to the first side by an application technique selected from cascading, misting, spraying, dipping, rolling, and
20 brushing.

7. The process of claim 2 wherein the first side includes an anodic layer and the etching composition morphs the anodic layer so that the anodic layer includes a bonding layer of about 4-10 nanometers in depth.

8. The process of claim 1 wherein the etching composition is selected from an acid and a base that dissolve an anodic layer on the anodized aluminum.

9. The process of claim 8 wherein the etching composition is sodium hydroxide of about 0.1 molar to about 0.5 molar.

5 10. The process of claim 9 wherein the first side is exposed to the etching composition for about 20 to about 60 seconds.

11. A continuous web of anodized aluminum modified according to the process of claim 1.

12. A continuous web of anodized aluminum modified according to the process of claim 9.

13. A process for modifying an aluminum article comprising:
providing an aluminum article with a plurality of anodized surfaces;
applying an etching composition to at least one selected anodized surface to improve the adhesive strength of the selected surface;
preventing the etching composition from contacting other anodized surfaces of the article.

14. The process of claim 13 wherein the etching composition is a solution including chemicals selected from sodium hydroxide, phosphoric acid, calcium hydroxide, hydrofluoric acid, sulfuric acid, bromic acid and chromic acid.

20 15. The process of claim 13 wherein the etching composition is applied to the selected anodized surface with application techniques selected from cascading, misting, spraying, rolling, brushing and dipping.

16. The process of claim 13 wherein the etching composition is prevented from contacting the other anodized surfaces by masking the other anodized surfaces with a film or sheet.

17. The process of claim 13 wherein the etching composition is prevented from
5 contacting the other anodized surfaces by shielding those other anodized surfaces with a member positioned adjacent to those other anodized surfaces.

18. The process of claim 13 wherein the etching composition is prevented from contacting the other anodized surfaces by blowing a gas against the other anodized surfaces.

19. The process of claim 13 wherein the etching composition is prevented from contacting the other anodized surfaces by cascading a liquid over the other anodized surfaces.

20. The process of claim 13 wherein the aluminum article is a structure selected from a web and a sheet.

21. The process of claim 20 wherein the etching composition is applied to the aluminum article by advancing the aluminum article over a plurality of rolling members including surfaces having etching composition thereon.

22. The process of claim 20 wherein the aluminum article includes a decorative side and a back side, the decorative side covered with a film and wherein the aluminum article is dipped in etching composition to apply the etching composition to the back side.

23. A process for modifying anodized aluminum sheets or webs including a
20 decorative surface and an adhesion surface comprising:

providing an aluminum sheet or web including a first anodized surface and a second anodized surface; and

administering a caustic solution to the first anodized surface to create an adhesion surface.

24. The process of claim 23 comprising preventing the caustic solution from contacting the second anodized surface.

5 25. The process of claim 23 comprising applying the caustic solution to the first anodized surface by techniques chosen from cascading, misting, spraying, dipping, rolling and brushing.

26. The process of claim 23 wherein the caustic solution includes chemicals selected from phosphoric acid, sodium hydroxide, calcium hydroxide, hydrofluoric acid, sulfuric acid, bromic acid and chromic acid.

Q0 27. The process of claim 26 wherein the caustic solution is applied at a temperature ranging from about 60°F to about 212°F.

28. The process of claim 26 wherein the caustic solution is applied at a temperature range from about 100°F to about 200°F.

Q5 29. The process of claim 23 wherein the caustic solution is prevented from contacting the second anodized surface by covering the second anodized surface with a film or sheet.

30. The process of claim 23 wherein the caustic solution is prevented from contacting the second anodized surface by administering a fluid over the second anodized surface.

31. The process of claim 23 wherein the caustic solution is prevented from contacting the second anodized surface by positioning a shield adjacent the second anodized surface as the caustic solution is applied to the first anodized surface.

32. The process of claim 23 wherein the first anodized surface is exposed to the caustic solution for about 20 to about 60 seconds.

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33. A continuous web of aluminum comprising:
- a first anodized surface which is a decorative side of the continuous web; and
- a second anodized surface etched with an etching composition, said second anodized surface being an adhesive side of the continuous web including a roughened morphology.
34. The continuous web of aluminum of claim 33 wherein the first anodized surface is colored.
35. A sheet of aluminum comprising:
- a first anodized surface which is a decorative side of the sheet;
- a second anodized surface etched with an etching composition, said second anodized surface being an adhesive side of the sheet including a roughened morphology.
36. The aluminum sheet of claim 34 wherein the first anodized surface is colored.
37. An apparatus for anodizing a continuous web of anodized aluminum comprising:
- means for providing a continuous web of anodized aluminum including a first side and a second side; and
- means for selectively etching the first side but not the second side of the continuous web of anodized aluminum.
38. The apparatus of claim 37 comprising means for preventing an etching composition from contacting the second side.
- 20 39. The apparatus of claim 37 comprising means for applying an etching composition to the first side of the anodized aluminum with an application technique selected from cascading, misting, spraying, dipping, rolling and brushing.
40. An apparatus for modifying a sheet of anodized aluminum comprising:

means for providing at least one sheet of anodized aluminum including a first side and a second side; and

means for selectively the first side but not the second side of the continuous web of anodized aluminum.

5 41. The apparatus of claim 40 comprising means for preventing an etching composition from contacting the second side.

42. The apparatus of claim 40 comprising means for applying an etching composition to the first side using techniques selected from cascading, misting, spraying, dipping, rolling and brushing.

40 43. An apparatus for etching one side of a continuous web of anodized aluminum comprising:

a tank for holding an etching solution;

a plurality of transfer members partially immersed in the etching solution; and

45 a plurality of guide members for guiding the continuous anodized web over the transfer members wherein the transfer members apply the etching solution a first side of the anodized aluminum web.

44. The apparatus of claim 43 comprising a fluid application member to apply fluid over a second side of the anodized aluminum web.

45. The apparatus of claim 44 wherein said transfer members are rollers.

20 46. An apparatus for modifying anodized aluminum web or sheet comprising:

a holding tank at least partially filled with an etching solution;

a plurality of guide members to guide a continuous web or sheet of anodized aluminum through said etching solution in said holding tank; and

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a masking applicator to apply a film to a first side of a continuous web or sheet before the web or sheet is immersed in the etching solution in said holding tank.

47. The apparatus of claim 46 comprising a film-removing element to remove the film after the continuous web has passed through the etching solution of the holding tank.

- 5 48. An apparatus for modifying anodized aluminum web or sheet comprising:
an application cell;
a plurality of guide members to guide a continuous web or sheet of anodized aluminum through said application cell; and
an applicator positioned to selectively apply a caustic etching solution to a first side of a continuous web or sheet but not a second side of the web or sheet in said application cell.
49. The apparatus of claim 48 wherein said applicator is one chosen from a mister, a sprayer, a brush and a cascading dispenser.
50. The apparatus of claim 48 comprising a shield member disposed adjacent said second side.
51. The apparatus of claim 50 comprising a fluid applicator that administers a fluid over the second side to prevent the caustic etching solution from contacting the second side.